

## **JAMESTOWN, NY WORKSHOP ON COMMUNITY ENERGY SYSTEMS September 11-12 2000.**

### **HUD's District Heating and Cooling Program –An Effective Economic Development Tool. [Lessons Learned] Robert Groberg, Director, Energy Division, U.S. Department of Housing and Urban Development**

#### **INTRODUCTION**

[Acknowledgments: NYSERDA support. Jamestown is a model. I. Olier consultant. Recognize the HUD team, which included: B. Manheimer, W. Clarke, A. Euston. Acknowledge use of their papers for this talk. Acknowledge the DOE team which included John Millhone and Floyd Collins. R. Groberg's role now is as energy staff in HUD, and consultant to DOE.]

This describes HUD's program from 1980 through 1995. It addresses the economic development lessons learned dealing with such things as: Advisory Working Groups, local chief executives and their key staff, state government support, formal studies, customer interest., building owners, local matching funds, consulting team visits, conferences, and distributing information.

#### **HUD's PROGRAM**

HUD's district heating and cooling (DHC) development activities started planning in the late 1970's. We teamed up with the Department of Energy to combine their technical analysis and prototype application projects with our community and economic development programs. HUD's funds for DHC assistance came from the Community Development Block Grant Program, which required citizen participation in the planning stages of local projects.

"The challenge of building or expanding DHC systems in U.S. localities is at least as much a matter of solving local government and institutional problems as technical/financial ones - yet the attention and resources devoted to technical solutions usually far outweigh those applied to institutional and governmental barriers."<sup>2</sup>

Whom do you need to make a deal?

For DHC we developed and tested the formation of local committees, Advisory Work Groups (AWG) "to deal, in a timely manner, with the primarily local governance and public perception aspects of a project, as well as to begin to define the technical, financial and legal concerns and identify potential key actors."

We each put in \$750,000 for cities to investigate the feasibility of developing district heating (and cooling) systems. In 1981 we announced the grant competition. Over one hundred communities competed. We selected 28, including Albany and New York City.<sup>3</sup>

These initial grants became known as Phase I and were to cover all of the cost of four activities:

- (1) identifying potentially useable heat sources such as an electric power plant, municipal incinerator, or an industrial facility's waste heat;
- (2) identifying clusters of high-heat-demand customers such as hospitals, apartment buildings, public- housing projects, and some types of businesses;
- (3) doing preliminary designs for a district heating network to connect the heat sources to these users; and
- (4) completing estimates of the costs of building the system and of the energy it would sell.

These Phase I projects were completed in 1982. Seventeen of the 28 cities identified apparently viable projects which they wished to develop further. The need for further development, anticipated at the beginning of the program, resulted in HUD holding another competition among the 28 cities. For the second phase, the winners received grants which contributed only one-third of the cost of completing the physical design, marketing, ownership arrangements, and financial packaging of the DHC project identified in Phase I. The other two-thirds had to come from local private sector and public sources which had an interest in the project. Each city was required to complete the system design and develop all of the data and analysis required by bond houses in underwriting the construction. This "Phase II" began in 1983, with the last of ten cities being funded in FY85. DOE was not a participant due to funding limitations.

These Phase II grants were awarded competitively on the basis of investment promise as a principal selection criteria. The prospects for success "were assessed by outside reviewers with sufficient experience to appraise the likelihood of success."<sup>4</sup> It turned out that their prospects rode on the price of oil.

As a result of these efforts, systems have gone into operation in ten cities <sup>5</sup> Project analyses indicated that the \$2.5 million public investment in these systems would produce \$100 million in private investment when they were completed.

HUD spent approximately \$1,000,000 in FY 84 and 85 on eleven new Phase I projects which were required to tie into Public Housing.<sup>7</sup> \$250,000 was programmed for technical assistance in FY 87. And another \$400,000 in 1988 with \$800,000 local match. [Baltimore, Camden, Detroit, Lincoln, New Haven, Tacoma. ]

In some cases private sector buy-outs and rehabilitation of existing systems were made possible as a result of HUD's technical assistance program. [Baltimore and St. Louis]

By the time we finished, HUD and DOE had funded DHC feasibility (Phase I) and system definition (Phase II) studies in more than 50 U.S. localities.

HUD also initiated technical assistance tailored to problems encountered by the cities who were trying to use municipal trash-burning as the heat source for their DHC system. These so-called waste-to-energy systems are considerably more complicated in their technical, financing, and ownership attributes. Their attraction is that they can solve two community problems simultaneously: efficient disposal of trash and reduced cost of energy for businesses, residences, institutions, and government operations. 6

Although an excellent beginning had been made, the prospects for continuing the program faded. By 1995 there was no further appropriation. HUD completed its grant program of support for DHC feasibility and design studies supporting energy systems.

But its 1999 *Five Year Energy Plan* [Report to Congress] contains the following statement:

"The Department ...will continue to explore the opportunities for voluntary participation in the use of combined heat and power by cities/counties to combine energy, economic development and environmental decisions." 8

There are opportunities are in Community Development Block Grant Programs and in Urban Development Action Grants. [See below.]

## THE ADVISORY WORK GROUPS [Lesson #1]

The AWG requirement was that each city create a committee with representatives from business, industry, banking, and utilities, as well as concerned local government agencies. This Advisory Group provided technical skills and business judgement to the development activity, and the interaction with the city's community development staff assured that the DHC system that emerged would complement the city's community and economic development programs. The Group members also served as valuable communications links back to important segments of the community whose support would be vital to project success. Neighborhood and citizen groups and local organizations involved with CDBG programs, utility companies, joint public/private entities, and private enterprises, were all important participants in the effort to bring a project to the state of construction.

HUD also indicated, in the request for applications, its belief in the importance of the AWG:

"The role of the DHC Work Group is **crucial to the analysis of the feasibility** of DHC projects and the applicant will place considerable emphasis on ensuring the full participation and cooperation of local persons and organizations which might be involved in or affected by the development of a DHC. Those DHC Advisory Work Group members which have data crucial to other phases of the project should identify that data to the applicant;..." (HUD, 1980, Request for Cooperative Agreement Application #6500.)

In a subsequent request for proposals the Department requested the formation of an AWG. However, because of the wider range of potential projects and their differing stages of development, such formation was not mandatory.

Our experience indicated that an AWG enabled potential DHC developers or expanders to achieve the necessary steps in determining the feasibility of, or initially defining, a DHC system that can garner enough support to actually be built. One would desire to (most likely need to) accomplish all or a significant portion of these steps, preferably with the support of an AWG. In structuring an AWG, HUD and DOE experience suggests the following:

**Enlist and gain the approval of the local chief executive and key staff for any substantially sized community project.**

1. In SAINT PAUL, then Mayor Lattimer and his staff took the lead in persuading critically important customers to contract with the new system.
2. In JAMESTOWN, then Mayor Carlson became the leading salesman, planner and path-smoother for its cogen DHC project. He demonstrated the extent of his involvement at one HUD/DOE-sponsored DHC progress meeting and displayed a map and cited, without notes, every present and projected customer and the amount of energy required for each.
3. One city progressed, with the aid of the long-time mayor and his city engineer, to the point of commitment of land, including the City Hall. Upon the mayor's death, a new mayor took over, appointed a new city engineer, and the project dropped back to square one - where it remains--in spite of a Federal grant of over \$1 million for system construction.

**In some larger cities, key staff might suffice, including the directors of:**

1. planning (concerned with infrastructure that shapes development patterns) ;
- 2.economic development (a potentially very valuable ally, often ignored);
3. public works (who will be concerned about problems caused by construction);  
and
4. budget and finance (particularly where bonding is being sought).

**Involve those building owners and managers who have control over potential major heating or cooling loads in the area being considered, including:**

1. hospitals;

2. local public buildings (libraries, schools, office buildings, the city hall;
  
3. Federal and state buildings (the Postal Service has indicated a willingness to consider hookup of postal buildings on a case-by-case basis and GSA has published a Memorandum (GSA, 1985) that states:

"DHCS can provide a reliable source of energy, reduce in-house operation and maintenance requirements, and increase usable space. It is our policy that full consideration be given to utilize these systems when opportunities arise, consistent with our policy of providing efficient and economical services.

"It is recognized that several of the older urban DHCS continue to face an uncertain future. There is also developing an increased interest in maintaining and improving these systems."); and

4. apartment complexes (including public housing).

The HUD Office of Public and Indian Housing published a Notice (HUD, 1988) that states, in part:

"To be financially successful, DHC systems require as customers a majority of buildings in the area in which they provide service. HUD, therefore, is encouraging public housing agencies (PHAS) to be alert to the possibilities of connecting to nearby planned or existing DHC systems and to cooperate with public and private sector concerns seeking to build these systems. Particularly, PHAs with older projects, where heating facilities are on the verge of needing major repairs or replacement, should investigate the possibilities of being connected to DHC systems."

With 1987 amendments to the public housing law, HUD embarked on a new initiative for public housing, involving "performance contracting," that can make connection particularly attractive for the housing authorities and, because it can help to finance the distribution line, to the developer and/or operator);

HUD regulations provide incentives for connection, including a variation of performance contracting deals. A waiver was given to Detroit Housing Department in 1991 to enable Detroit Edison Steam to connect to a 2,100 unit public housing project. Detroit Edison was reimbursed for the cost of the line from the energy and operation and maintenance savings that the authority realized. The Housing Department also shared in the savings.

5. industrial and commercial complexes; and
  
6. military bases and facilities (The Department of Defense has published a Defense

Energy Policy Memorandum (DOD, 1984) that states, in part:

"User Coordination - The Department of Housing and Urban Development (HUD) has been studying the feasibility of third party financing of district heating systems to help revitalize economically depressed interurban areas. HUD has funded feasibility studies in many cities and has a program of matching block grants to assist municipalities in attracting private capital. In those urban areas near Defense facilities, HUD would like to have the facility energy requirement be considered as a possible "base load" of such district heating or cogeneration plants. It is the policy of the Department of Defense that cooperation with, and support of, such beneficial programs of other Federal and local agencies should be given within the bounds of the installation's legal authority and with primary consideration given to continued, reliable mission support.")

**Involve potential sources of finance and potential system owners or operators :**

1. Community development or other agencies that control Community Development Block Grants (CDBG) for the Community (For current HUD purposes, it is considered a major plus if the proposed system or expansion will benefit low and moderate income people and is tied into the economic development plans for the locality--particularly if the locality is willing to provide some CDBG assistance.);
2. banks and other financial institutions;
3. local agencies such as public works and water departments; and
4. existing DHC facilities.

Involve pertinent local utilities. (Eliminates the possibility of complaints about not being informed on proposals and provides an opportunity for the gas or electric company to own or operate the system.)

Involve local or state agencies with which you must coordinate or receive permission, such as:

1. public works department (to receive permits and coordinate planning for tearing up streets, etc. Often DHC construction can be worked in with other planned local improvements);
2. environmental agencies; and
3. public utilities commissions.

## **EXAMPLES**

### **Opportunities for signing on good loads such as public buildings and entities:**

Local Government for load - In LINCOLN, city buildings provided all the load for first loop, which is now being expanded to include additional users. In ALBANY, early involvement by a rehab director, caused all rehabbed buildings in an area being studied for DHC feasibility to be fitted with connections for a possible DHC link; and

2 . Public Housing Authorities for load - Existing DHC systems in BALTIMORE and DETROIT have found significant advantages in connecting to public housing.

### **Local Government as Facilitator**

1. In KANSAS CITY, a local agency was able, by rallying customers and petitioning the Public Utilities Commission, to delay closing of a utility-owned system until it could be bought out by a DHC system developer.

2. Systems in SAN JOSE and PROVO owe their existence to the actions of local agencies.

3. In JAMESTOWN, the local public electric company agreed to cogenerate the necessary thermal and in LINCOLN, the local public utility provided major staff and for the planning and ownership arrangements.

**State Government Assistance:** A 1988 survey identified 16 states with district heating programs. [US Department of Energy, US Conference of Mayors "State programs to Assist Communities in District Heating and Cooling," November 1988.]

NYSERDA's program was clearly the most active, best funded with \$1.9 million in financial and technical support over six years. It resulted in systems being built, renewed, or expanded in JAMESTOWN, BUFFALO, and ROCHESTER.

In WASHINGTON STATE, the Energy Office developed computer programs for system feasibility Advisory and design. It provided cities technical assistance in the use of the program. WASEO has also been a financial contributor and technical leader of a project in TACOMA that will be the energy infrastructure for the renewal and revitalization of the neighborhood surrounding an historically

significant railroad station. The proposed system has been a factor in the State's decision to locate a new branch of the university in that neighborhood.

3. UTAH used schools and hospitals funds received from the Department of Energy to carry out retrofits of principal loads for the new system in PROVO which was crucial in making the system financially feasible.

### **Conclusions on the use of AWGS**

Collectively, these examples suggest the importance of enlisting all of the relevant local players. Although there are possibly other methods for doing this, bringing the influential players together under the banner of an AWG creates a shared sense of responsibility and commitment that does not arise when the development team pursues important players individually. It also permits trade-offs of interests before the project plans are locked in concrete. An environment is created in which it is possible to obtain local insight and sound advice on how the project can be made most attractive considering not only the financial concerns of the individual customer but the broader interest of the community as a whole. This sense of civic responsibility can be important in tipping the scales in favor of signing up for district energy when the potential customer does not think that the impact on his balance sheet is sufficiently great to warrant the headaches and risks involved.

### **Technical Assistance Teams [Lesson #2]:**

HUD funded small teams of national experts to address the specific problems with the development of waste-to-energy, district heating and cooling, and other critical elements of a community energy system. Discussions with the top city staff lead to a workscope and an assignment to be completed by the team during a two or three-day visit to the city. An exit briefing for the mayor and his key staff delineates the options and recommended courses of action for the city, and a written report follows the briefing.

Technical assistance teams visited Knoxville TN, Indianapolis IN, Erie PA, Auburn NY, Kansas City MO, Wilkes-Barre PA; and Chicago IL. Reports were completed for each city. As a result Knoxville redirected the development of its waste-to-energy system and Kansas City decided to take a strong position to avoid abandonment of the downtown system by its electric utility owner, which resulted in its sale and operation by a private company. Auburn is proceeding with the development of a system, and Chicago has decided to loan technical expertise to the developer of a seventy acre tract south of the loop to assure the inclusion of a central energy system. [8-18-89 Memo to A. Scott, General Deputy Assistant Secretary, Community Planning and Development, HUD, "DHC accomplishments." (Clarke?)

**Dissemination of Information on Successful Approaches [Lesson #3]:** HUD worked closely with the Department of Energy's research and development oriented program. DOE relied on HUD to facilitate the application of their findings to community economic development and housing programs across the country. With DOE, we sponsored seven



annual community energy systems conferences. These conferences were regarded as the single most important forum for the exchange of information on both current project development and new directions for the community energy systems industry.

We made considerable effort to upgrade the quality and general appeal of the information HUD disseminates on how community energy systems can be developed and operated to enhance economic competitiveness. In addition to written materials such as workshop and conference proceedings, we produced video tapes. [Si Olier has a set. I can provide others.]

We videotaped HUD's Sixth and Seventh Annual Conferences on Community Energy Systems in collaboration with DOE. Four professionally edited, fifteen minute tapes were produced from some twenty hours of raw material. They feature the leadership role of the mayor. [Jamestown and Mayor Steve Carleson play an important role.] They also present the perspective of developers and the economic development potential of DHC systems. These tapes were distributed to organizations and communities across the country.

### **Using UDAG Funds for DHC [An Opportunity]**

One source of funding that New York State should explore in its current new initiative is the Urban Development Action Grant Program. While there are no new federal appropriations, there are two sources to consider from UDAG grants made in prior years.

There is a stream of loan repayments that developers are making to cities who used UDAG funds to finance economic development projects. The control over these repayments is generally vested in the city government, and the choice of uses usually requires political consensus. The economics of a new DHC project may compete well with other proposed uses.

Then there are funds from the original UDAG agreements that have not yet been drawn down by the city. These "undisbursed" funds can be made available by amending the original agreement with HUD. The new project activities have to be tied to the original activities, but HUD has been lenient in its determinations about the connections.

In preparing for this Workshop, I consulted our Office of Economic Development where I learned that five cities in New York State have undisbursed balances:

1. Buffalo (two projects with grant balances).
2. Gloversville
3. Newburg
4. New York City (five projects with grant balances)
5. Port Jervis.

I do not have details. To follow up, contact Jeff Ruster, Deputy Assistant Secretary for Economic Development , HUD. (202) 708-2290 ext 2076.

### **Other Lessons?**

There are seven lessons from HUD's Phase II projects cited by Clarke and Euston :[op cit Clarke and Euston in Meshenberg,"District Heating and Cooling: Experiences of Eight Phase II Cities," HUD 1122CPD, October 1987, Page iv],

- " (1)"DHC's many cost efficiencies are desirable to have in place
- (2)"such benefits are to become proportionately far more valued should fuel costs continue to escalate
- (3)"it is easier to expand an existing system than create a new one....

"where none exists there is real value in getting a city's DHC system started, even if on a small scale."

(4)"once adopted as an objective, the creation of new DHC systems needs to proceed as a collective effort on the part of key local interest groups. HUD's requirement for [AWG's] ...in these Phase II projects is designed to give this investment in DHC development packaging its best chance of fruition. When a city engages a cross-section of people to get acquainted with its DHC potential, there results a build-up of resolve, of technical grasp, of local institutional memory and of political power that is the best insurance that, when timing is right, a system can be promoted.

"A premise, coming out of present experience has to do with the value of doing formal DHC studies per se, for

(5) once a round of substantive DHC study has been completed and endorsed by the advisory work group, critical ideas, analysis and awareness needed in building a new system are at hand to support the reaching of decisions for any alternative configuration. A corollary here is that

(6) with a new system put into motion the momentum for introducing additional systems - that is, ones not necessarily connected to the original - may become much greater.

"We have seen how difficult it can be to create a totally new system, given the complexities of DHC's legal, financial, institutional and political contexts. Despite these complexities progress has been made in the cities reported on in this report. What makes the most difference besides competent, steadfast pursuit of a system (besides leadership) has been customer interest. That, of course, is a function of anticipated cost-savings, and that is directly impacted by competing fuel costs.

"One final assumption is offered, regarding fuel. Taken as a matter of local economic interest,

(7) it benefits a local economy to reduce the amount of money exported for fuel. Fuel costs become reduced through DHC. In most places this savings gets retained as capital for local investment - capital which has a multiplier effect. (Minnesota finds that to be in the range of 2.62 times the energy cost savings.)

"In summary, these projects demonstrate that the development of a DHC system

R. Groberg presentation: "Lessons Learned from HUD-DOE DHC Program"

creates an important community asset. The process is complex, and it is strongly influenced by variables not all of which can be controlled by the system's proponents. For communities concerned about long-term stability of energy costs, one of the most important ingredients in their economic efficiency and competitiveness -- district heating and cooling or DHC-- is an asset now warranting their deliberately focused attention." 4

### **Endnotes**

1. "DHC Feasibility In a Community - As Much A Question of Local Support as of Technical/Financial Capability", by Bernard Manheimer, Energy Management Specialist and Wyndham Clarke, Deputy Director, Energy Division, Office of Environment and Energy, U.S. Department of Housing and Urban Development, 1991.
2. *ibid.*
3. 28 Cities Selected for DHC Feasibility Studies in 1981: Albany NY, Allentown PA, Atlanta GA, Atlantic City NJ, Baltimore MD, Bellows Falls VT, Berlin MD, Cambridge MA, Campbellsville KY, Columbus OH, Dayton OH, Devils Lake ND, Ecorse MI, Fort Wayne IN, Galax VA, Gary IN, Holland MI, La Grande OR, Lawrence MA, Lewiston ME, Missoula MT, New York NY, Norwalk CT, Provo UT, Richmond IN, Santa Ana Pueblo NM, Springfield MA, Thermopolis WY.
4. Clarke and Euston, pp iv, District Heating and Cooling: Experiences of Eight "Phase II" Cities by Michael J. Meshenberg, Energy and Environmental Systems Division, Argonne National Laboratory, 1987.
5. 10 systems in operation were : Baltimore, Devils Lake, ND; Lawrence, MA; Galax, VA; Holland, MI; Provo, UT; Richmond, IN; Springfield, MA; San Jose, CA; and Hibbing, MN].
6. Waste-to-energy studies: Atlantic City NJ, Carolina PR, Chicago IL, Lake County IN, Lawrence MA, Springfield MA, York PA.
7. (6) HUD 1988 Phase II Awards  
Baltimore MD, Camden NJ, Detroit MI, Lincoln NE, New Haven CT, Tacoma WA  
(5) HUD Phase II Awards (1991) Baltimore, Camden, Jamestown, Metro-Dade, State of Rhode Island
8. ***HUD Five Year Plan for Energy Efficiency 1999-2003*** Report to Congress June 1999
9. In its Request for Cooperative Agreement Applications No. 6500 (HUD, 1980), from which the first 28 localities were selected to receive HUD and DOE DHC feasibility funding, HUD defined an AWG as follows:  
 "DHC Advisory Work Group - A DHC Advisory Work Group consists of the party or parties necessary to carry out the provisions of the cooperative agreement and bring a project to the stage of construction. Parties comprising the DHC Work Group may include, but are not limited to: units of local governments or their agencies; neighborhood groups; citizen groups and local organizations involved with local CDBG programs; utility companies; industrial companies; state energy offices or public utility commissions; joint public/private entities; and private enterprises."  
 -Rationale for HUD Support for DHC:  
 "HUD is interested in the potential of such systems to contribute significantly to CDBG communities' ability to achieve the nationally established objectives of community development articulated in Title I of the Housing and Community Development Act of 1974. The system would lower energy costs, reduce environmental pollution, and expand local economic opportunity, particularly for persons of low and moderate income." [ Request for Proposals]